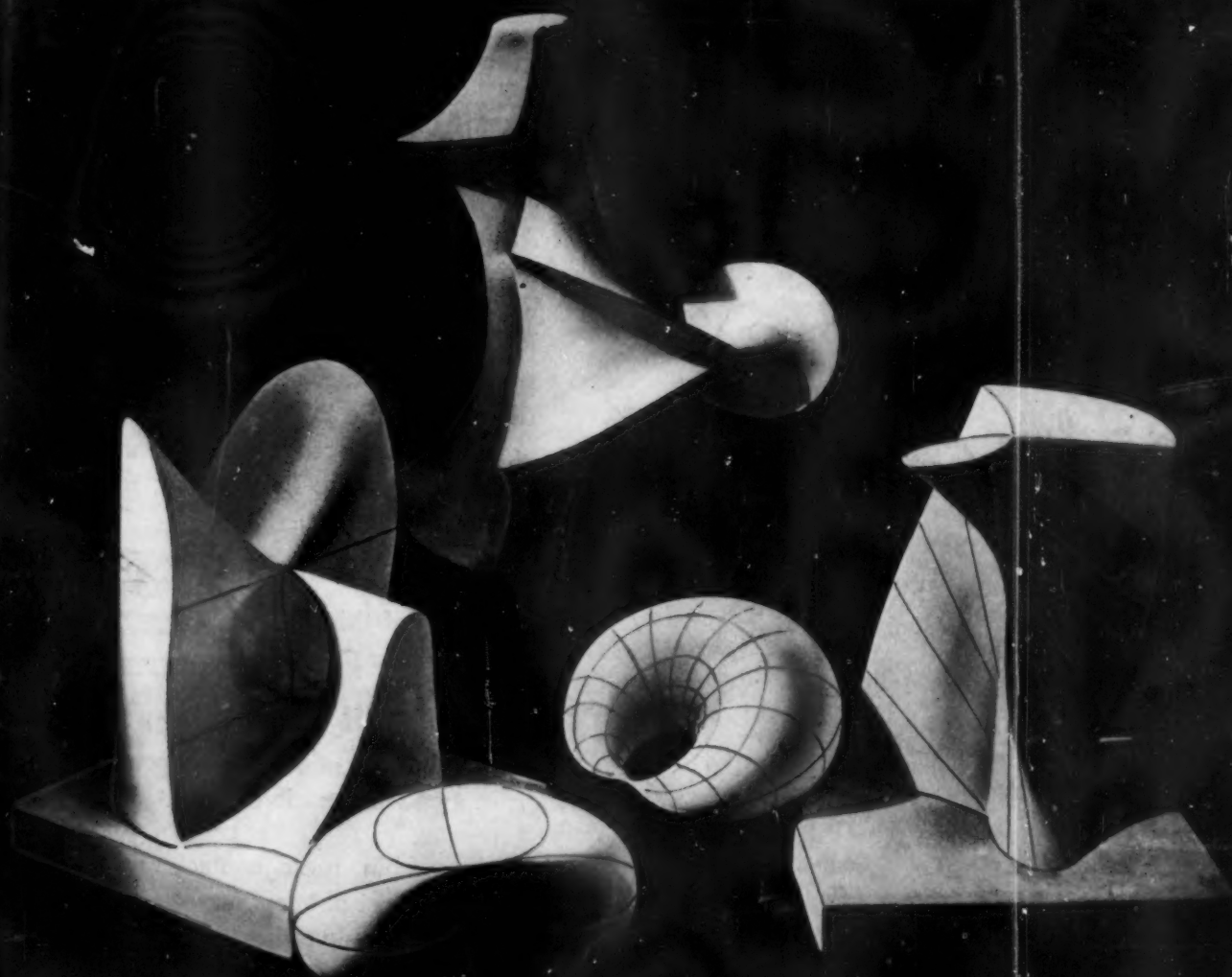


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SCIENCE NEWS LETTER

PUBLISHED WEEKLY

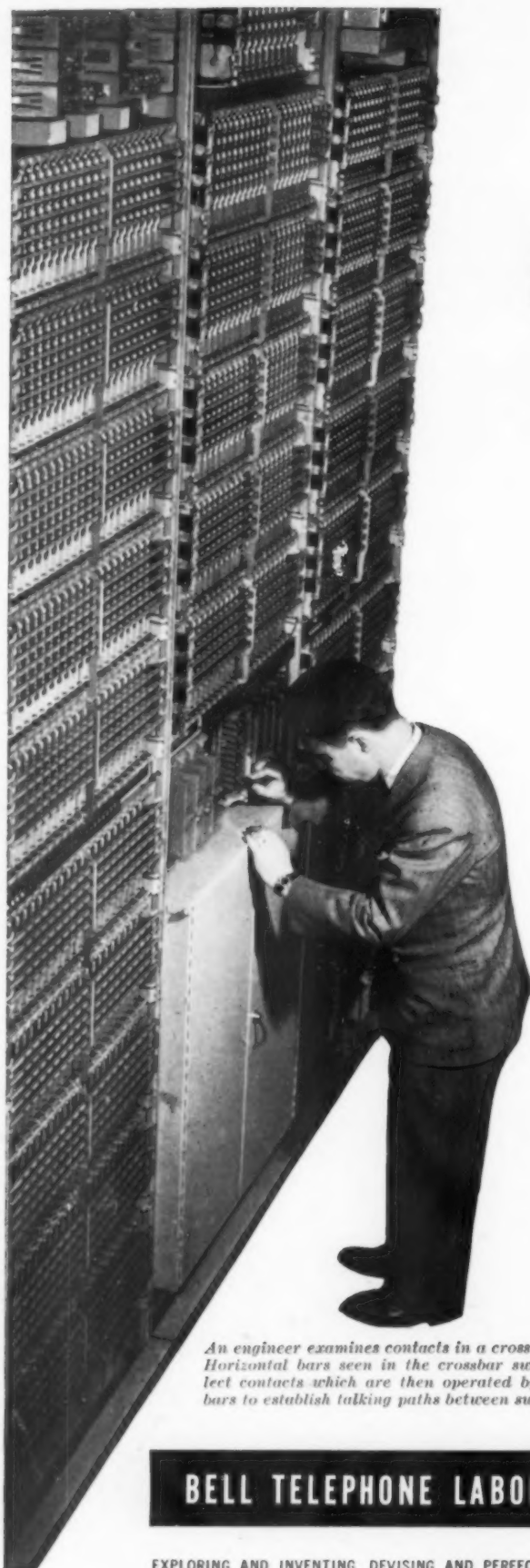
THE WEEKLY SUMMARY OF CURRENT SCIENCE - AUGUST 9, 1947



Mathematical Models

See Page 35

A SCIENCE SERVICE PUBLICATION



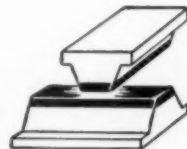
An engineer examines contacts in a crossbar office. Horizontal bars seen in the crossbar switches select contacts which are then operated by vertical bars to establish talking paths between subscribers.

A BILLION ORDERS A DAY

In a large modern telephone office 2,000,000 switch contacts await the orders of your dial to clear a path for your voice. They open and close a billion times a day.

At first, contacts were of platinum—highly resistant to heat and corrosion but costly. Years ago, Bell Laboratories scientists began looking elsewhere, explored the contact properties of other precious metals—gold, silver, palladium and their alloys—and with the Western Electric Company, manufacturing unit of the Bell System, restudied shape, size and method of attachment.

Outcome of this long research is a bar-shaped contact welded to the switch and positioned at right angles to its mate. For most applications, an inexpensive base is capped with precious metal.



Savings from these contacts help keep down the cost of telephone service. This is but one example of how Bell Laboratories serve the public through your Bell Telephone Company.

BELL TELEPHONE LABORATORIES



EXPLORING AND INVENTING, DEVISING AND PERFECTING, FOR CONTINUED IMPROVEMENTS AND ECONOMIES IN TELEPHONE SERVICE

MEDICINE

Atomic Attack on Disease

Radioactive chemicals may tell much about how diseases spread. Many medical advances have already been made with isotopes in a year.

Report of the peacetime accomplishments of atomic energy continues on the next page, telling the results of research in agriculture.

➤ MANY of the great disease killers of mankind, from heart disease and cancer to still unconquered germ diseases, may yield to atomic attack.

Radioactive chemicals, produced in the same chain-reacting pile at the Clinton Laboratories which produced the atom bomb just two years ago, are the weapons for medicine's atomic attack on disease.

Such unsolved medical mysteries as how infantile paralysis spreads might be solved with these peaceful atomic weapons. The solution would come by tagging the virus cause of the disease with a radioactive chemical from the pile. Its now hidden invasion route and progress through the body could then be followed by the tell-tale radioactivity with which it had been endowed. Sure knowledge of whether the virus gets into the body by being swallowed with food or water or whether it comes in on breaths of air, like the common cold virus, would give scientists a much better chance of stopping its spread.

First steps toward such knowledge may already have been taken. Scientists at the U. S. Public Health Service's National Institute of Health have found a way to tag bacteria with radioactive chemicals. They want to learn more about immune processes by which the body fights germ invasion.

Tagging viruses might be an even more difficult feat, but it has been accomplished in the case of at least one virus, that of tobacco mosaic, which is a plant disease.

In the single year since the first shipment of radioactive isotope chemicals produced in the Clinton Laboratories at Oak Ridge was made to the Barnard Free Skin and Cancer Hospital in St. Louis the following atomic advances in medicine have been made:

1. Discovery of a better treatment for congestive heart failure. This resulted from the finding, by Dr. George E. Burch of Tulane University School of Medicine, that in patients with this heart

condition sodium as well as water escapes from the blood vessels into the tissues. Because sodium is a "thirsty" element, water follows the sodium out of the blood vessels. This results in the dropsy of congestive heart failure. As a result of these studies with tagged atoms of sodium, patients are now given medicines to eliminate the excess sodium as well as the excess water in their tissues.

2. Treatment of chronic forms of leukemia, lymphoma and Hodgkin's disease with radiogold, which has turned out to be "exceedingly useful" in these conditions.

3. Development of methods for learning more about how cancers are produced through the use of a cancer-producing chemical, methylcholanthrene, tagged with radioactive carbon 14.

4. Quantitative measurements of blood circulation with red blood cells tagged with radiophosphorus which showed conclusively that in heart disease when heart arteries are clogged (coronary thrombosis) other blood vessels take over the job of the blocked ones.

5. Successful treatment of patients with overactive thyroid glands, too sick for surgical removal of the gland, with ra-

dioactive iodine which has also been used to attack cancer of the thyroid.

6. Discovery of new knowledge for fighting anemia through use of radioiron which appears in the red blood cells and shows the rate at which these cells are made and how iron is absorbed and utilized in the body.

7. Tagging of penicillin and other drugs to learn more of how they stop or kill germs in the body and, perhaps, how to develop more effective drugs.

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CHEMISTRY

Powerful Anti-Malarial Found in Chinese Plant

➤ EXTRACTION of two anti-malarial chemicals, one of them 100 times as powerful as quinine, is announced by J. B. Koepfli, J. F. Mead and John A. Brockman, Jr., California Institute of Technology chemists, in a report to the *Journal of the American Chemical Society*.

The chemicals were obtained from the leaves and roots of a plant long known to the Chinese as having anti-malarial properties. In China, its roots are called Ch'ang Shan. Botanical name for the plant is *Dichroa febrifuga*.

Febrifugine and isofebrifugine are the names the chemists give the new anti-malarials. The names, as well as the last name of the plant, come from two Latin words meaning fever-reducing. Febrifuge is an old medical term for any fever-reducing remedy.

Science News Letter, August 9, 1947



CHECKING RADIATION—Fission product materials emitting high levels of radiation are processed inside a thick walled concrete cell. This shows apparatus on the outside wall where all operations are performed by remote control. Radiation emitted through an opening is being checked with an instrument called a "cutie pie."

RADIOBIOLOGY

Unlocking Plant Secrets

"Tagged" molecules are tracing plant life processes. Peacetime uses of radioactivity will outweigh destructive use of atomic fission.

➤ **SUGAR FORMED** in one leaf of a large sugarcane plant during one hour's work in the sun was distributed to all parts of the 11-foot, seven-pound stalk within three days. This hitherto unsuspected fact of plant life was demonstrated through the use of carbon atoms "tagged" with radioactivity at the Clinton Laboratories atomic pile and sent to Honolulu for research purposes.

Traced Through CO₂

In the Honolulu laboratories of the Hawaiian Sugar Planters' Association, Dr. George O. Burr and his co-workers combined the radioactive carbon with oxygen to make carbon dioxide. This "tagged" CO₂ they fed to one leaf of a large sugarcane plant for one hour on a sunshiny day. The sugar thus formed was found wherever it went in the plant by pointing a Geiger counter at various parts. Most of the "ticks" that betray the presence of radioactive matter came from the young, growing parts of the cane: root-tips, stem-tip, newest leaf. But there was radiosugar in all parts except a few of the oldest leaves.

Now the Honolulu researchers are making up larger quantities of radiosugar, to be sent to other laboratories for nutritional studies on animals. It will be traced through their bodies just as it was traced through the sugarcane stalk. One sample of radiosugar has already been sent to Dr. Harlan G. Wood of Western Reserve University in Cleveland, Ohio, who will pry its complex molecules apart to see just where the radioactive carbon atoms are built in.

This is only one sample, out of scores of research projects that have been started since radioactive elements were first made available for use in peacetime investigations of biological, medical, agricultural and industrial problems, only one year ago, and less than two years after the blasting of Hiroshima. More than 1,000 shipments of radioactive elements and compounds have been made thus far.

Another plant research project of both theoretical and practical importance in-

volves the use of radioactive iron. Iron is needed in small quantities by all green plants; it is an indispensable catalyst in the formation of chlorophyll, the green pigment that captures sun-energy and uses it in making sugar. Phosphorus, another element essential to plant life, under certain conditions "acts cussed", and blocks the iron entry through the roots. Then the plant becomes pale and anemic-looking—chlorotic, in the plant physiologist's jargon. Chlorosis is more than a laboratory term: fruit trees suffering from it cost American orchardists millions of dollars every year in lost yields. So Dr. Orlin Biddulph of the State College of Washington is working on this phosphorus-iron antagonism with tracer atoms of radioactive iron.

From Soil to Milk

At the University of Florida, a radio-tracer research task begins with the soil in a cow pasture and winds up in baby's bottle. Radioactive elements, especially cobalt and copper, necessary though only in minimal amounts, are introduced into the soil. Thence they are traced into the grass and legumes that grow from the soil, into the cow that eats the plants, through her into her milk and thus to the ultimate consumer.

These three examples of radiobiological research are only random samples taken from scores of similar projects being carried on in dozens of laboratories and field stations. Among other radioactive elements from the atomic pile in Oak Ridge that are being used in these researches are sulfur, iodine, calcium, potassium, sodium and beryllium.

Industry as well as biology and agriculture is making use of "tagged" atoms. Radioactive iron incorporated into steel is used in studies of frictional wear. Radiocalcium in cement helps to place more accurately the sealing-off layers of concrete deep in oil wells, that block ruinous water-flows. Radiosulfur is helping metallurgists to understand better what happens to this nuisance element in iron smelting. And so on almost indefinitely.

Peacetime uses of atom-splitting have of necessity lagged behind the develop-

ment of the atom bomb. But they bid fair to overtake and pass this first destructive use of atomic fission.

Science News Letter, August 9, 1947

RADIO

Jeep Gets Voice and Ears

➤ **VOICE AND EARS** have been added to the jeep in the form of a high-powered two-way radio, to be used in the Navy. Self-powered, the new radio can be used even when the vehicle is running six feet under water. The receiver is so small that it can fit into the glove compartment.

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MARINE BIOLOGY

"Red Tide" Destroys Fish

This phenomenon, described in the Bible, is caused by sudden increase in the number of red one-celled organisms that poison fish.

► "RED TIDES" like the present one that has been killing myriads of fish off the Gulf coast of Florida are far from being a new thing under the sun. Thomas F. Austin, of the U. S. Navy's Hydrographic Office, has been searching all records for mentions of such outbreaks, and finds first mention in the Book of Exodus, chapter 7, verses 20-21: "... and all the waters that were in the river were turned to blood. And the fish that was in the river died; and the river stank, and the Egyptians could not drink of the water of the river; and there was blood throughout all the land of Egypt."

"Red tides" are caused by sudden increases in number of red-colored one-celled organisms that are near the borderline between plants and animals, down near the bottom of the evolutionary scale. They have big names because only biologists pay any attention to them as a rule; two quite common genera are known as *Gonyaulax* and *Peridinium*, belonging to the order *Dinoflagellates*.

They are normally present at all times but in small numbers. When something happens that offers them highly favorable conditions for growth, like an upwelling of bottom water bringing up more food materials, they multiply at a terrific rate, until they color the water red, as swarms of corpuscles make the blood red.

They appear to produce an active poison, which has not yet been identified. Fish placed in water containing them die quickly, presumably absorbing the poison through their gills. They are also held responsible for the occasional outbreaks of mussel poisoning on the California coast. Rock mussels, a favorite shell-fish, suck them in as food—and anyone eating mussels at times of "red water" takes chances with his life.

Tales of the "red tides" and the windrows of dead fish being caused by dumping of war gases into the Gulf are absurd on their face. The government did dump huge quantities of lewisite and other gases after World War 1, but it took them far out in the open Atlantic and sent them to the bottom in sealed

containers. When corrosion finally released the deadly stuff it was so diluted in the ocean's vast bulk of water that it was never noticed, even by the fish.

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PALEONTOLOGY

Corals Built Skyscrapers Of Lime Many Years Ago

► Modern architects may not be so modern after all. Today's skyscraper apartment houses look very much like an apartment house built about 400,000,000 years ago in the Silurian sea by a colony of tiny corals called Favosites.

The Favosites had an answer to the housing problem; their building was a by-product of their favorite pastime, eating. The animals deposited lime as a product of digestion and respiration. This deposit made a protective coating for their soft bodies.

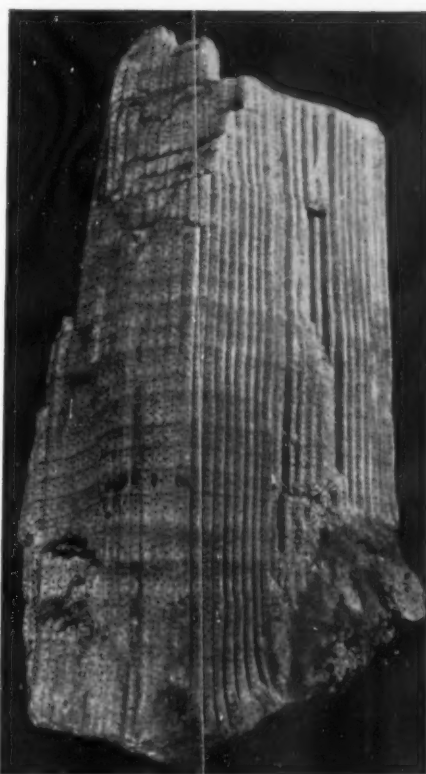
Being so tiny, it was to their advantage to live in colonies, so each coral's lime nook touched its neighbor's. As the animal ate and breathed, the lime coating grew. In time, the coating would become too great for it to reach around to grab food, so the Favosite would pull itself to the top of its tube and build itself a floor to stand on to catch its microscopic wild game.

This repeated moving to the top caused the one-tenth inch long animals to finally reach the top of a structure that might be several feet high.

The dots that look like windows on the structure are holes the corals left for buds to grow out of. A bud is a young coral that grows out from the side of the parent. Some of these buds were crowded out by next-door neighbors. The regularity of the "windows" indicates that the whole colony got the impulse to sprout buds at the same time.

The abandoned lower apartments filled with crystalline calcite, even during the lifetime of the animals themselves. This gave these tiny marine architects a firm foundation to build on.

Scientists can look at the houses of these animals and determine what the



"SKYSCRAPER"—Ages ago, corals built residences that resemble today's modern apartment houses.

dwellers must have looked like, reports Eugene S. Richardson Jr., curator of invertebrate fossils at the Chicago Natural History Museum.

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MATHEMATICS

Weird Models Represent Mathematical Equations

See Front Cover

► NOT MODERNISTIC dancers, or weird animals from the moon, the models on the cover of this SCIENCE NEWS LETTER represent mathematical equations. Instead of being described by a single equation, however, they are formed by the operation of certain combinations of equations under specific mathematical controls. Rutherford Boyd posed these mathematical models at Columbia University. They are shown here by courtesy of the journal *Scripta Mathematica*.

Science News Letter, August 9, 1947

Ten years ago China supplied the United States with about 99% of its imports of dried eggs, frozen eggs and tung oil, and about 70% of the imports of shelled walnuts and sesame seed.

MEDICINE

Sulfa for Undulant Fever

Whole blood, that contains new antibodies, is given patients. Theory is that the drug fights disease by increasing the action of the antibodies.

► **NEW TREATMENT** which may save the lives or relieve the suffering of victims of undulant fever was described to the Fourth International Congress for Microbiology by an American scientist.

The treatment is a new use of the famous sulfa drugs. Dr. I. Forest Huddleson, Michigan State College bacteriologist, told the Congress that four persons near death with high fever from the disease had recovered after receiving the new treatment.

Dr. Huddleson injects blood into the system of the patient and then administers small doses of sulfadiazine for one week. He believes the principle of the treatment may be used to save the lives of sufferers of many other infectious diseases.

Undulant fever is also called Malta fever, brucellosis and Mediterranean fever. Human victims get the disease from cows, goats or pigs. It may come from drinking the unpasteurized milk of cows which have the disease. Persons with undulant fever are subject to re-

curing attacks which cause considerable disability though the disease is seldom fatal.

Earlier experiments with sulfa drugs against undulant fever were unsuccessful, and there was little hope of curing the patient unless he was treated within 10 days after contacting the disease.

Dr. Huddleson explained his theory that the drug fights disease by increasing the action of antibodies in the system of the victim. When the patient has had the fever for several weeks, the antibodies become inactive from the disease and are not aided by the drug. This, he said, accounted for the lack of success in treating undulant fever with sulfa drugs in early experiments.

Injecting whole blood into the patient supplies fresh antibodies to fight the disease. Then Dr. Huddleson administers sulfadiazine to the undulant fever sufferer.

He hopes to develop a compound in which physicians can give undulant fever victims both the antibodies and the drug without using whole blood.

Science News Letter, August 9, 1947

AERONAUTICS

Giant Plywood Seaplane

► **THE GIANT** Hughes Hercules flying boat, the building of which with government money is now raising questions on the part of Congressmen, is a seaplane with some four times the estimated carrying capacity of the war-tested veteran Martin Mars. Its actual capacity is not known because the airplane, while reported to be afloat on the water, has not yet even been given taxi-tests on the water's surface.

The surface tests will be given soon, it is said, but only after engineers have completed making thorough tests with various testing instruments of its component parts, both by themselves and as a part of a whole. These tests have largely to do with the proper functioning of the parts under all conditions and particularly under the stresses to which they will be subjected in use. No

promises have as yet been made when surface tests will begin, or when a try-out will be attempted in the air. It is now about two years behind the date on which it was to have been completed.

This Hughes flying boat has a wingspread of 320 feet, and a 220-foot-long hull. The Martin Mars was 200 feet in wingspread and about 117 feet in overall length. The newer Mars, JRM in the Navy, is about the same size, but has certain refinements. The original Mars on one trip carried 35,000 pounds of cargo.

Size alone is not the only point of interest in the eight-engine Hercules. It is of plywood construction rather than of the usual light metals such as aluminum and aluminum alloys. This plywood is built-up panels and beams of very thin sheets of wood with each alternate sheet laid crosswise, and the

whole strongly and permanently bonded with a resin. The use of plywood in planes is not new, but it has been mostly in light aircraft.

The Hughes Aircraft Company, builder of the Hercules, was organized in 1936 by Howard Hughes to develop a racing plane with which he had already established a world record. It was a modified version of his original plane with which he made a non-stop flight in 1938 across the country in seven hours and 28 minutes.

In 1939, the company started development work with plastic materials for plywood airplane construction. In 1942, Mr. Hughes joined with Henry J. Kaiser to build three experimental cargo flying boats for the U. S. government. They were to be eight-engine planes of original design, made of wood because of a scarcity of suitable metals. The order was cancelled in 1944, partly because of delays in starting construction and partly because metals for construction were then available.

The Hughes company produced a high-speed, twin-engine experimental plane in 1944. From this was developed a military reconnaissance monoplane which carried the Army designation XF-11.

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CHEMISTRY

New Insecticide Claimed Safe for Vegetable Use

► **CORN-ON-THE-COB** without worms is the promise of a new insecticide now undergoing field tests. Rhothane is the trade-name of the new product, which is a close chemical relative of DDT but claimed to be so much less toxic to human beings and farm animals that it is safe to put on vegetables intended for table use.

U. S. Department of Agriculture entomologists state that the new insecticide differs from DDT in having one atom less of chlorine. DDT is dichloro-diphenyl-trichloro-ethane. Rhothane is dichloro-diphenyl-dichloro-ethane. That is, its initials are DDD instead of DDT.

Another claim advanced on behalf of Rhothane by Rohm and Haas Company, its sole manufacturers, is that it is less toxic to fish, so that it may meet the wishes of wildlife administrators for a material that can be used against mosquito larvae without harming the fish that swim in the same waters.

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ENGINEERING

Taming Missouri River

Work that will take a generation to complete has begun. Four dams are being constructed and will give some flood control benefits by 1949.

► THE JOB of taming the Missouri river, under the flood control program recently commended by the President, has already begun. Four dams on tributaries are now being constructed by the U. S. Reclamation Service. The gigantic main-stream dam at Fort Peck, Mont., is practically completed, and work has begun on another gigantic dam, the Garrison, in North Dakota.

All dams on the Missouri tributaries will be constructed by the Reclamation Service under present plans and those on the river itself by the Army Corps of Engineers. The ambitious program may require a generation to complete, but some flood control benefits will be obtained by 1949. Irrigation benefits and hydroelectric power will soon follow.

In the Reclamation Service program, a total of 93 dams is planned. The Bureau has picked out 46 as available for immediate construction when funds are appropriated. These 46 will do much to control floods on the Missouri, and they fit into the integrated water-control pattern. The four under construction are the Kortess and the Boysen dams in Wyoming, Angostura in South Dakota, and the Enders in Nebraska.

The authorized Missouri control program, known as the Pick-Sloan plan, calls for expenditures of some \$2,000,000,000, and would be for the particular benefit of ten states in the Missouri basin, but in addition would have some effect on flooding in the lower Mississippi Valley.

The Missouri basin represents about one-sixth of the total area of the United States. The Missouri river itself is nearly 2,500 miles long. It has hundreds of tributaries between western Montana and the point where it empties into the Mississippi near St. Louis. Most important are the Yellowstone, Niobrara, Platte, Kansas and Osage.

The area of the upper basin, where many dams on tributaries are proposed, is agricultural and grazing territory which needs irrigation for dependable crops. The lower basin needs protection against floods. The proposed works, in addition to flood control and providing

irrigation water, will develop much electrical energy. This is needed for modern farming and by the urban industries of the basin. In fact, a plentiful supply of electric power might attract many industries to the region, some of which would use its natural mineral resources.

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ASTRONOMY

Many "Shooting Stars" Can Be Seen in August

► AUGUST is the month of "shooting stars," or meteors.

This is because, during the first three weeks of this month, the earth will be crossing the path of the Perseid meteors. You do not have to be an astronomer to enjoy the nightly showers of these bits of cosmic dust which each year invade the earth's atmosphere in August.

On any clear dark night, you can normally see an average of one or two shooting stars an hour. But during the next two weeks, you will be able to see many more.

High point in the number of Perseid meteors will come the night of Aug. 12, with many shooting stars each night from the ninth through the thirteenth.

Best time to see the Perseids is between midnight and dawn. They will seem to be coming from the constellation, Perseus, the champion, which rises in the northeast on August nights.

What we call shooting stars are not stars, but bits of cosmic dust associated with comets. These meteors, as they are more properly called, are usually burned and vaporized by friction as they enter the earth's atmosphere. A few, however, have reached the surface of the earth, and these are known as meteorites.

Although the Perseids seem to radiate from one point in the sky, they will be seen all over the early August sky. Some of the brightest of the Perseids will be brighter than the largest of the planets, Jupiter.

The path through which the Perseids move is the same as that of Tuttle's comet, last seen in 1862, and the meteors which you can see may be the remains of the comet.

If you want to help astronomers count the shooting stars from this month's showers, make a record of the number of meteors you see and when you observed them. Then send your count to Dr. Charles P. Olivier, director of the Flower Observatory of the University of Pennsylvania and president of the American Meteor Society, at Upper Darby, Pa.

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When Germany owned the Pacific Truk islands, large numbers of *coconut palms* were brought in and planted and are now the principal tree species of the area.



FILM STRIPPING—A thin film is applied on airplane de-icers to protect the rubber from hot weather. At the end of the season it can be stripped off as shown.

PHYSICS

Humidity Controlled In Electric Refrigerator

► AN ELECTRIC refrigerator with accurately controlled humidity is the claim advanced by Wilson P. Boothroyd of Philadelphia for patent 2,424,735, which he has assigned to the Philco Corporation. Control is effected by means of what he calls a "humigrid". This is a plate of glass or other non-conducting material having on it a grid of thin platinum ribbon. Resistance to flow of an electric current rises when the humidity goes up, falls when humidity decreases. These changes can be used to turn on and off the necessary humidity control mechanism.

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AERONAUTICS

Helicopters Now Deliver And Collect Mail Sacks

► HELICOPTERS will soon be picking up mail sacks at the Los Angeles airport, delivering them to the central post office and carrying mail from the central office to other post offices with a range of 50 miles. They also will pick up mail at the suburban offices.

Los Angeles Airways, Inc., the first company to be given a government Civil Aeronautics Board certificate for helicopter mail and property service, will have three years in which to demonstrate the value of this new type of mail handling. The company will serve 30 post offices, traveling over three routes that total some 200 miles in length. Four Sikorsky S-51's are to be used. They will make three daily runs over their routes, greatly cutting down the present time for truck deliveries and collections, it is expected. Service will begin this fall.

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RADAR

Altimeters To Aid Safety In Commercial Transports

► WINTER bad-weather flying will be safer this year in commercial transports now being equipped with radar altimeters. These permit a pilot to know just how high he is above the ground.

One company, United Air Lines, has just revealed that it has purchased 200 of these instruments for installation in mainliners and that they will be in use late this fall.

The radar altimeter is an electronic instrument that indicates to a pilot his height above the surface of the earth below, or the distance to mountain obstacles ahead. Its effective range is approximately 8,000 feet, both below and ahead of the plane.

The instrument sends out a radio signal similar to the pulse emitted by radar devices. It is reflected back by the earth, and the elapsed time of its travel from the plane to the ground and return is measured and converted automatically into feet on an indicator on the plane's instrument panel.

The instrument can be pre-set to give a warning light at any altitude of less than 1,000 feet. In fact, it has three lights: a green one shows that the plane is well above the pre-set elevation, an amber light shows when the plane is approaching the pre-set altitude, and a red light indicates that the plane is at or below the safe level.

Planes will continue to use standard aneroid barometers. These indicate height above sea level, not the height above the underlying terrain. The two types of altimeters will be used in conjunction with each other.

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CHEMISTRY

Ammonium Nitrate Needs Careful Handling to Ship

► THE AMMONIUM nitrate explosion of a cargo ship in Brest Harbor, France, following so closely the similar Texas City disaster, will probably upset the idea of some explosion experts that additional regulations to be followed in handling and shipping this important chemical are unnecessary. They refer to pure ammonium nitrate, uncontaminated with organic material.

Ammonium nitrate, in peacetime, is used largely in fertilizers. In wartime it is used both for fertilizers and in explosives. Hundreds of thousands of tons were made during the war in the United States for the government.

Domestic production before the war was only a few thousand tons each year, but much was imported. Now it seems that very much will continue to be made in America because its use in farming has greatly increased. It probably will be a permanent competitor of sodium nitrate and ammonium sulfate for top-dressing and side-dressing crops. Interstate shipments will exceed greatly the quantities shipped in the past. (See SNL, April 26.)

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IN SCIENCE

ARCHAEOLOGY

Early Natives Caught Cod 3,500 Years Ago

► CODFISH were caught in Massachusetts long before the Colonial "cod-fish aristocracy" built its fortunes on this lusty and profitable fish. Test borings on the Back Bay site of a new skyscraper in Boston have turned up fish weirs that Indians built of stakes and brushwood, estimated to be 3,500 years old. Marks of these early settlers' stone axes can still be seen on the wood.

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MISSILES

Proximity Fuze Tested In Bombing Forest Fires

► BOMBS triggered by the famous proximity fuze may be used to fight forest fires.

Carrying fire-fighting chemicals, the bombs would be dropped from Army bombers and exploded at the level of tree tops to battle the costly blazes which each fall take a high toll in American forests. Tests bombings of controlled, man-made fires in Montana have been successfully completed, E. F. Horton of the National Bureau of Standards disclosed.

The new attack on forest fires was born a year ago at a meeting of scientists at the Bureau of Standards. Dr. E. U. Condon, director of the Bureau, urged that some of the wartime achievements of the Bureau should be turned to peaceful uses. Harry Diamond of the electronics section, which played a leading role in the development of the proximity fuze, suggested using the fuze against forest fires.

In the Montana experiments, the 165-gallon auxiliary fuel tanks of Army Air Forces P-47's and one-ton general purpose bombs of B-29's were filled with water and dropped over the experimental fires set by the U. S. Forest Service. The fuze exploded the tanks and bombs over the fires, either putting out the fire or wetting the surrounding area.

Millions of dollars worth of precious timber may be saved by bombings on forests in this country if the new attack is carried to forest fires.

Science News Letter, August 9, 1947

SCIENCE FIELDS

ORDNANCE

Permanent Magnet Gives "Snap" to Trigger Action

► GOOD SHOOTING with small arms is always faced with a dilemma. The novice is always told not to jerk the trigger but to "squeeze" it. This, however, introduces the mechanically undesirable factor known as "creep." To overcome this and obtain "snap" in rifle or pistol firing mechanism, Lt. Col. J. F. McCaslin of the Army places within the gunstock, just in front of the trigger, a small but strong permanent magnet. A horizontal arm of the trigger, made of a metal only lightly attracted by the magnet, is in contact with it. As the trigger is squeezed, this paramagnetic arm resists just enough so that when it does break free the desired "snap" is imparted to the action.

Rights in Col. McCaslin's patent, No. 2,424,247, are assigned royalty-free to the government.

Science News Letter, August 9, 1947

BACTERIOLOGY

New Machine Kills Germs With "Death Whispers"

► A MACHINE that makes germ-killing with "death whispers," or supersonic waves, more effective by putting a quaver in them is the subject of U. S. patent 2,424,357, issued to C. B. Horsley of Stamford, Conn.

Supersonic waves, which are like sound waves but come so fast no human ear can hear them, have been known for some 25 years to be effective in killing microscopic life forms. However, they have not been used as widely as they might, partly because there seems to be a critical lethal wavelength for each species—possibly more than one for some species, according to its age or other condition. So Mr. Horsley has undertaken to lay down a barrage of wavelengths by rapid modulation of a basic wavelength over any desired range or rate.

This is accomplished simply by placing a piston facing the vibrating diaphragm in the chamber containing the fluid to be sterilized, and moving this piston rapidly in and out while the diaphragm vibrates. This increases and

decreases the effective wavelengths in accordance with what physicists know as the Doppler effect.

Another machine that produces the same effect with both audible and supersonic waves in air is covered by patent 2,424,375, granted to W. A. Van Allen of Cambridge, Mass. In his machine, the face of the piston becomes a reflector for a "beam" of waves striking it at an angle, and modulates them in the same way.

Both patents are assigned to the Ultrasonic Corporation of Boston.

Science News Letter, August 9, 1947

RADIO

Planes To Use Static-Free Microwave Communication

► U. S. ARMY planes of the near future will be equipped with static-free radio communication systems, Brig. Gen. F. L. Ankenbrandt of the Army Air Forces told the General Electric Science Forum. This will be accomplished by using the so-called microwaves, better known perhaps as exceedingly short radio waves.

These are transmission waves of ultra-high frequency similar to those used in television. They follow "line-of-sight" paths, so can not be used for long distances except where no obstacles intercept them. Ordinary radio waves follow the curvature of the earth, or are reflected from air strata high above the earth. The great objection to their use is due to static; very-high and ultra-high frequencies are practically static-free.

The installation of very-high frequency communication at all airports under the supervision of the Civil Aeronautics Administration is a definite plan of that organization, and many such installations have already been made. The CAA so-called radio-ranges will also use very high frequency known as VHF for short. These ranges provide the radio "beam" which pilots "ride." The beams, shot from carefully located stations along air routes, are followed by pilots with the assistance of instruments on their airplane panels.

"We are developing a great many devices which show promise of minimizing the effects of noise on our aircraft communication systems," the general stated. "We have found most types of atmospheric noise to be practically nonexistent in the ultra-high frequency or micro-wave region of the radio frequency system."

Science News Letter, August 9, 1947

ENTOMOLOGY

Grasshoppers Get Late Start on Wheat Crop

► GRASSHOPPERS were held back so effectively by the chilly, rainy spring and early summer weather over the Plains area this year that the bumper crop of wheat is being harvested without their being able to do it any harm. They are showing up in numbers now at the northern end of the Plains. However, state U. S. Department of Agriculture entomologists, it is not planned to attack them with poisoned bran bait until just before time to do the fall seeding for next year's crop.

There is heavy grasshopper infestation in Arizona and parts of California, and in these states poisoned bait is being distributed.

During the war, when all supplies of arsenic were needed for other purposes, sodium fluosilicate was substituted for the arsenicals formerly used in grasshopper baits. This was found so satisfactory that its use is being continued in most places. Arsenic baits are necessary under certain special conditions, such as heavy hopper infestation in alfalfa.

Science News Letter, August 9, 1947

CHEMISTRY

Five-Minute Francium Turns into Astatine

► A NEW TWIN of one of the most recently discovered chemical elements turns into another rare element after existing only five minutes.

Prof. F. A. Paneth of Durham University called the attention of the International Chemical Congress to this new isotope of element 87. This fundamental chemical building block was christened francium only this year by Mlle. Marguerite Perey of the Paris Radium Institute, who first discovered a radioactive isotope of element 87 with a half-life of 21 minutes.

The new isotope of 87 with a half period of five minutes emits alpha particles and changes into the element astatine number 85.

The discovery of the new five-minute francium isotope will be reported in a scientific paper by Drs. A. C. English, T. E. Crawshaw and their collaborators to be sent to the Physical Review, U. S. scientific journal.

Science News Letter, August 9, 1947

ENGINEERING

New Pleasure in Rail Travel

Better view, dust-free air and reduced noise are among the new improved features of rail cars. Roadbeds and safety are first concern of officials.

By A. C. MONAHAN

► RAILROAD tracks in America are far from being headed for the scrap pile. Railroads feel keenly the competition from airliners, buses, trucks and private cars. They are meeting it with "service." And this does not mean merely what one road advertises as "service with a smile."

It is railroad service, all designed to assure speed, safety and passenger comfort. It includes better roadbeds, signaling systems and rolling stock. It also includes more dependable train schedules both for passengers and for freight. It provides ways to keep passengers happy, ranging from constant radio programs and motion pictures to dancing facilities and glass-covered domes on car tops for those who want to enjoy the scenery along the route.

Safety First

Passenger comfort and pleasure is not the most important item in the present railroad improvements or in those of the near future. But it is the item of popular appeal. Railroad passengers assume that the tracks and trucks on which they ride are always in condition. They assume that railroad management will take full care of proper train operation.

They are therefore concerned with smooth-riding, freedom from dust and noise, fresh air and a comfortable temperature, summer and winter. Then they want easy chairs in which to sit, chairs in which they can sleep if they wish. They want plenty of room, good food, and comfortable beds if they are in sleeping cars.

Railroad officials are concerned first with the things that make rail transportation possible, reliable and safe. These have to do with such things as the track, locomotives, cars and operational procedures, including a proper signalling and communication system. These are items the passenger does not see, but there would be no comfort, or safety, for passengers without them.

Smooth riding depends upon the roadbed, the car springs, softening pads and shock absorbers under the cars. Sway is lessened with cars with a low center of gravity. Aluminum bodies make a low center of gravity possible, and they lessen the weight the locomotive has to pull.

Noise is diminished by properly shaped wheel flanges and track rails, also by shock absorbers. Important, however, is the elimination of the constant clank-clank of wheel passing over rail joints. Welded joints between abutting rails, replacing the ordinary bolted plate connections, get rid of most of this clanking. Elasticity in ballast under rails and ties helps decrease noise, and double windows go a long way in keeping outside noises out.

Air-conditioning is an important item in passenger comfort. To be satisfactory the system must deliver fresh air, freed from dust, soot and engine gases, which is heated or cooled as required. Proper

distribution within a car is essential. No longer is it considered satisfactory to admit conditioned air at one end and remove fouled air from the other. Air-delivery ducts, and bad-air exhausts, must be placed throughout the length of the car, and heated air must be available on the floor to keep the passengers' feet warm.

All these things are planned for trains of tomorrow, and many of them are already in use in new postwar trains. Their inclusion, together with other modern essential structural improvements, may double the cost over the old type car but, to meet the competition, railroads will supply them as rapidly as possible and rely on increased traffic to repay the indebtedness they must incur.

Tomorrow's Trains

As a sample of what trains of tomorrow will be, a new train of today may be cited. It is the so-called Empire Builder. Five such trains were put in service in the late winter this year by the Great Northern Railway and the Burlington Lines for fast transportation between Chicago and Seattle.

The Empire Builder, drawn by a 4,000-horsepower diesel locomotive, includes 12 cars. They are a mail-baggage car, four coaches, a coffee shop, a diner, four sleepers, and a combination sleeper-lounge-observation car.

One of the coaches is a 60-passenger type. The other three are of the new "Day-Nite" design, and have chaise-longue reclining seats. They provide maximum riding comfort during the day, and at night the passenger obtains full-length sleeping comfort by reclining his seat and pulling down a large upholstered leg rest which is built flush into the back of the seat ahead.

For Pullman sleeping accommodations, passengers may choose an open section, a duplex-roomette, bedroom or a drawing room. Duplex-roomettes are relatively new. By an ingenious up-and-down staggering of this single-occupancy room, to conserve space, engineers have provided private room accommodations at only slightly more than the cost of a lower berth.

The Union Pacific is already operating similar trains between Chicago and Portland, Ore. Like other new trains, its cars are of the latest type of con-



SAFER TRIPS—Behind the scenes, many new devices are working for your protection, such as the walkie-talkie which keeps train and yard personnel in constant communication.

struction, using alloy material of high tensile strength, thus reducing the weight of cars as compared with older types. All cars are equipped with high-speed, electro-pneumatic brakes and roller bearings, and with air-conditioning.

General Motors now has a traveling train which it is exhibiting at various cities throughout the United States that it calls the "Train of Tomorrow." General Motors does not build cars, but it builds much of the equipment that is put into them, particularly electrical and air-conditioning units. It calls the new trains an experimental project to try out ideas for the improvement of railroad travel. It does build many diesel locomotives for mainline traffic.

In addition to riding comfort, railroad officials know travelers enjoy viewing the country-side through which they are passing. Particularly they enjoy expansive farm lands and mountain valleys. For that reason, observation cars have been added to trains, and bigger and better windows provided in coaches. G. M. goes a long step ahead—with an "Astra Dome" on its cars.

The Astra Dome car has a double deck in its center section. Passengers on the upper deck ride with their heads above the ordinary roof, protected by a special transparent covering. Their elevated position gives them a superior viewing advantage. The seats give them the same comfort as those below.

Above Roof Level

The dome itself is two feet above the car roof level. It is 30 feet long and 10 feet wide. There are 24 seats for passengers in the domes on sleeping, chair and lounging cars, and tables and seats for 18 on dining cars.

Its glass covering is double. The outer panel is polished plate glass containing special ingredients to absorb the heat rays of the sun. It is especially tinted to cut the sun glare. It has been heat-treated to give it perhaps four times the strength of ordinary plate glass.

The inner pane of the double glass covering is similar to laminated automotive safety glass. It is made up of two layers of plate glass with a layer of a transparent plastic between. The plastic used is thicker and tougher than used in automobile glass, and is tinted to give it glare-reducing properties.

Present and coming improvements in railroading were emphasized at the recent ten million dollar railroad exhibit at Atlantic City. Two floors of a conven-



ASTRO DOME—If you take your vacation trip on one of today's new trains, you can have a much better opportunity to see such gorgeous scenery.

tion hall and half a freight yard were filled with equipment, including new locomotives, aluminum cars and refrigerators, ranging from railroad iron for tracks to paper drinking cups for passengers.

Many trains in America are now in constant touch by radio with the train dispatcher along their routes, and engineers and conductors on the same train are in touch with each other. Switch engines in freight yards are also controlled by radiophone. A system, installed by the Farnsworth Television and Radio Corporation of Fort Wayne, Ind., has been in operation over a year in the Potomac Yard, across the river from Washington, D. C. This is one of the world's three largest classification yards. All switch engines making up great freight trains receive orders direct from the control tower by telephone of the radiophonic type.

On the "Cincinnatian," a Baltimore and Ohio new train between Baltimore and Cincinnati, and on other trains as well, loud-speaker systems call all station stops for the benefit of passengers, and are used by dining car stewards to announce "Dinner is now being served." Between times they bring radio programs to the passengers.

Smokeless locomotives will bring comfort to passengers and to the countryside as well. New developments for the ordinary coalburner makes smoke unnecessary. Giant electric and diesel locomotives coming almost daily into use belch no smoke. Steam turbine and gas turbine locomotives, which may soon become common, are smokeless. Then there is the new coal-burning gas tur-

bine which will be ready for the rails in 1948. Its fuel is a highly pulverized coal which burns under conditions where no smoke is produced.

Science News Letter, August 9, 1947

MARINE BIOLOGY

Male Limpets Change Sex To Grow into Motherhood

► SEX LIFE among the limpets must be just a bit complicated. Like their distant relatives the oysters, as well as other mollusks, limpets change sexes during their lifetime. With them, sex seems to be a matter of size. Dr. G. Bacci of the Zoological Station of Naples reports in *Nature* (July 19), that the smaller, and presumably younger, limpets are usually males. As they gain size they apparently become fitted for the burdens of motherhood, and change into females.

Limpets are small mollusks protected by single flattish cone-shaped shells that look like miniature volcanoes. They cling so tightly to tideline rocks that to "stick like a limpet" has become proverbial. During the war, the name limpet was given to a highly successful sabotage device consisting of an explosive charge with time-fuze, attached to a magnetized base. Shoved against the side of a ship below the waterline by a quiet swimmer, this device would cling to the steel hull until it exploded. Limpets of this dangerous variety are still being used by terrorists against British vessels in the troubled waters of Palestine.

Science News Letter, August 9, 1947

Do You Know?

White has the highest light reflection value of any paint.

Theater stage electric lighting was first tried 100 years ago.

To produce one ear of corn, 50 gallons of water are required, an agricultural scientist recently stated.

Home gardeners can make successive plantings of many vegetables throughout the summer.

To make the best cattle feed, alfalfa is cut before it is more than half in bloom.

Six queen bees, recently flown from California to Australia for experimental breeding, were valued at \$100 each.

A total of 3,970 superfortresses, the B-29 plane that acquired fame against the Japs, were constructed during or immediately following the war.



Photo courtesy Univ. of N. Carolina

Equipment for Teaching Electrolytic Conductivity

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OPTICS

Man Must Learn To "See"

► A PERSON born blind who later gains his vision does not have the world of sight suddenly burst upon him in full glory. Even the sight of food means nothing to him. He must learn to see.

What happens when the eyes first look at the world has been observed in an experiment on chimpanzees conducted at the Yerkes Laboratories of Primate Biology by Dr. Austin H. Riesen.

Baby chimpanzees were raised in darkness until they were 16 months old. By that time they were able to sit and reach and run around in a way about like that of a two-year-old human child. Naturally they had never used their eyes.

Then these babies were brought into the light for their first look. They were blind!

They would turn their heads toward a light. Their eye pupils would dilate or contract with changes in light intensity. They would be startled by sudden changes in illumination.

But aside from these responses to light, they saw nothing. Even if a chimp playmate hit one of them in the face with something, they did not blink or show any sign of avoidance until the object actually touched the skin. Then they jumped, startled.

Like human babies, the chimps would put the nursing bottle in the mouth eagerly as soon as it touched the arm, hand or face. But if it was held before them, they gave not a single sign of recognition. It was not until one of them had been in the light for 11 days that she puckered up her lips on sight of the bottle. Not for 16 days—48 meals—did she learn to reach for it.

Study of humans born blind and later given their sight by removal of cataracts showed that they, too, have great difficulty learning to "see."

The prompt visual learning so characteristic of adult humans and apes is not, therefore, an inborn capacity, but requires a long apprenticeship in the use of the eyes. Dr. Riesen concludes in his report of the experiment in *Science*, (Aug. 1).

Lower in the animal scale this period of apprenticeship is much shorter, he found. A baby chick uses his eyes just as soon as he comes out of the shell. His efficiency is further improved after the practice given him by a dozen pecks. Rats, brought up in darkness, are at

first unable to use their eyes but can learn within 15 minutes to jump in response to what they see. After an hour they act just like normally reared animals.

Science News Letter, August 9, 1947

NUTRITION

UN Plans Food Shipments To Needy Children Soon

► FIRST SHIPMENTS of food to Europe's underfed children and expectant and nursing mothers from the United Nations International Children's Emergency Fund are expected to be made this month, it was reported at the meeting of the Committee on Child Nutrition.

Medicine and clothes for needy mothers and children in Europe are also being planned as the ICEF carries on now-terminated work of the United Nations Rehabilitation and Relief Administration.

Austria, Greece and Poland were mentioned at the sessions as the countries likely to receive the first shipments of food. In all, a dozen nations and 20,000,000 children in war-torn areas are expected to be covered by the emergency program.

Top priority food needs of these children, as outlined by nutritional experts of several nations at the conference, are animal proteins, calcium and vitamins. Supplies of whole milk for European children less than one year old, and skim milk for older youngsters were urged as basic needs.

First part of the food program is being financed from a fund of more than half a million dollars which the group inherited from UNRRA. Most of this sum is going into dried milk. U. S. contribution of \$40,000,000 for the ICEF has been authorized by Congress and the first payment of \$15,000,000 will be made soon.

Norway already has donated 1,000 barrels of vitamin-rich cod liver oil to the Fund.

By the end of the year, ICEF hopes to have spent \$70,000,000 in improving the diets of five to six million European children.

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if gasoline were sold in sacks...

it would be easy to stencil everything you'd like to know about the ingredients it contained right on the sack. However, gasoline is generally delivered direct to your gas tank, sight unseen. Oil companies can't label each gallon. That's why they put the familiar yellow-and-black "Ethyl" emblem on their pumps to show that they have improved their best gasoline with "Ethyl" antiknock compound. This famous ingredient, which improves engine power and performance, is made by the Ethyl Corporation, Chrysler Building, New York 17, New York.

look for the **ETHYL** trade-mark





Tame Them Young!

► WE ARE SO USED to thinking of the width of rivers in terms of maxima that the idea comes hard, that somewhere in their upper courses are places where a man could cross them with one stride. True, official geography says that the Mississippi has its source in Lake Itasca, Minn., that the Ohio is formed by the confluence of the Monongahela and the Allegheny at Pittsburgh, and that the Missouri comes into being by the union of three rivers, Jefferson, Madison and Gallatin. But on the other side of the lake, and at the upper ends of self-immolating rivers that lose their identities in that of the larger streams, there are certainly those same dwindlings down to mere brooks.

A few rivers are born big; they burst forth from underground drainage like Minerva from the forehead of Jupiter. But they are exceptions; the normal thing is for a river to start small and grow large, as babies grow into men. This

analogy fails at one point, however; rivers are simultaneously infants in one place and giants in another; and the giant is a giant because so many infants feed it.

This long prelude leads up to a very practical point. The giant, as we have had tragic occasion to know this year, becomes unruly at times and wreaks terrible destruction. And that is because its thousands of infant feeders start gorging it with water they have received from the clouds at the same time, or nearly the same time.

With only one of two notable exceptions, we human beings who are all too often the victims of streams that should be our servants think of taming the raging giant only in straitjacket terms. We build levees along the banks. The more the giant rages, the higher we raise the earthen walls, until finally comes a night of terror when the giant's strength becomes too great for even the

thickest, stoutest straitjacket. Then we pay for our folly, always with our wealth, often with our lives.

There are a few prophets abroad in the land who see clearly how the giant can be kept in more or less orderly mood all the time. This is not to be done by any improvements in direct restraint but rather by an indirect restraint consisting in taming the little feeder streams.

This can be accomplished in many different ways, all of which can be employed simultaneously. We can build thousands of small, cheap check-dams where the rivers are less than three feet wide. We can terrace and contour-plow sloping fields, putting the brakes on runoff water. We can re-sod and reforest denuded areas. Every pint of water held back at headwaters means less trouble for folks farther downstream when heavy rains do come.

Science News Letter, August 9, 1947

BALLISTICS

N.Y. in Nazi Bomb Plan

► THE GERMANS planned a bomb to cross the Atlantic and blast New York. It was a rocket to be started on its long journey by another rocket which detached itself when its job was done.

This was revealed by Brig. Gen. William L. Richardson of the U. S. Army Air Forces.

General Richardson, chief of the AAF Guided Missiles and Air Defense Division, spoke as a guest of Watson Davis, director of Science Service, on Adventures in Science, heard over the Columbia network.

The Germans, he said, developed several rockets known as the "A" series. The V-2; used against London, was one of these and although it was the only one of this series to be used operationally in the last war, it is not hard to visualize what might have been in store for the Allies had the Germans been given sufficient time to complete developments.

Each of the "A" series was developed primarily for research with the exception of A-4, later known as the V-2. The A-10 was the end result toward which this whole program was directed. This is the weapon which the Germans expected to use in bombing New York.

The A-10 was described by him as a booster rocket placed behind the A-9 giving it two-step cooperation to secure ranges of 3,000 miles. The A-9 was

much like the A-4, more familiarly called the V-2, with wings added to give increased range and using acid as an oxidizer in its fuel.

The A-10 was never actually constructed. However, all design studies and computations had been completed, and it appears that it could have been built and served its purpose provided the Germans had been given another year of development and production.

The total weight of the A-10 was to have been 190,000 pounds, of which 140,000 was fuel. The weapon was nearly 12 feet in diameter and 25 feet long. The 29,000-pound A-9 was to have been accelerated to a speed of 2,500 miles an hour by the use of the A-10 as a launching rocket, which detached itself and would drop free after serving its purpose.

It is the A-9 that would reach the target. Its rocket motor would be turned on when the A-10 dropped. This would increase its speed to about 6,000 miles an hour. It would have carried a warhead of about 2,000 pounds. This is a payload of only 1% of the starting weight of the weapon, but there is evidence to believe, he stated, that the Germans intended to utilize an atomic warhead which would have made this weapon a very serious menace.

Science News Letter, August 9, 1947

YOUR

HAIR

AND ITS CARE

By O.L. Levin, M.D. and H.T. Behrman, M.D.

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Books of the Week

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BIRDS OF MALAYSIA—Jean Delacour—*Macmillan*, 382 p., illus., \$5. A practical handbook of birds inhabiting Malaysia for those interested in birds but not having special technical knowledge.

CAREERS FOR NURSES—Dorothy Deming—*McGraw-Hill*, 358 p., illus., \$3.50. A guide for graduate nurses, this text discusses 15 branches of special nursing with job description written by a nurse active in that specialty; it should help all students choose wisely in their profession.

CATALOGUE OF NORTH AMERICAN BEETLES OF THE FAMILY CLERIDAE—Albert B. Wolcott—*Chicago Nat. Hist. Museum, Fieldiana: Zoology*, Vol. 32, No. 2, 105 p., paper, 75 cents. Designed for the purpose of informing those concerned with North American Cleridae of some necessary changes in nomenclature and systematics.

THE GEOGRAPHICAL NAMES OF ANTARCTICA—Dept. of the Interior, U. S. Board on Geographical Names, Special Pub. No. 86, 253 p., free. The result of most careful study by the board and examination of all available material.

LESSONS IN ARC WELDING—*Lincoln Elec. Co.*, 3rd ed., 152 p., illus., 50 cents in U. S. A., 75 cents elsewhere. Complete and thorough instruction in all phases of arc welding for both new and experienced welders.

MATHEMATICS AS A CULTURE CLUE—Cassius Jackson Keyser—*Scripta Mathematica*, Vol. 1, 277 p., \$3.75. Essays develop the nature of mathematics, mathematical applications, and the bearings of mathematics.

MEDICAL ADDENDA: Related Essays on Medicine and the Changing Order—*Commonwealth Fund*, 156 p., \$1.75. Further development of the trends underlying the practice of medicine reported by the New York Academy of Medicine Committee on Medicine and the Changing Order; psychosomatic medicine, medical social work, psychiatric social work, rehabilitation and convalescence, and chronic diseases.

METHODS OF VITAMIN ASSAY—Assn. of Vitamin Chemists—*Interscience*, 189 p., \$3.50. This manual for the analyst includes only those methods which have been tried on a variety of materials by several committee members.

MUSCULAR CONTRACTION—Sandow, et al.—*N. Y. Academy of Science, Annals*, Vol. XLVII, Art. 6, pp. 665-930, paper, \$3. A discussion of contractile muscle fiber, dealing with dynamics, ultrastructure, chemistry, and mechano-chemical coupling.

PROCEEDINGS OF THE FIRST CANADIAN MATHEMATICAL CONGRESS—Montreal, 1945—*Univ. of Toronto*, 367 p., \$3.75. Contains discussions on secondary school mathematics, statistics, engineering mathematics, and research and graduate work and emphasizes the need for cooperation

among mathematicians for the exchange of ideas.

THE PROCEEDINGS OF THE THIRD PSYCHOTHERAPY COUNCIL—*Inst. for Psychoanalysis*, 176 p., \$2. This two-day council discusses "A Case of Peptic Ulcer", "A Case of Migraine", and "The Psychiatric Out-Patient Clinic of the Future".

STATISTICAL ANALYSIS IN BIOLOGY—K. Mather—*Interscience*, 2nd ed. rev., 267 p., \$5. Designed to help the biologist appreciate the potentialities of statistics in the interpretation of data, it shows the scope of various methods and their interrelation.

STUDIES ON CARBOHYDRATE AND FAT METABOLISM WITH SPECIAL REFERENCE TO THE PIGEON—Oscar Riddle and Associate—*Carnegie Inst. of Wash.*, Publication 569, 128 p., paper, \$1.85, cloth, \$2.25. Information on the physiology of the pigeon and the relatively few observed differences in mechanisms for carbohydrate and fat metabolism in birds and mammals.

TRAIN YOUR HEARING—Mary Wood Whitehurst—*Volta Bureau*, 90 p., \$3. An outlined method of self-training for those wearing hearing aids to help them re-educate their residual hearing. Although emphasizing the fact that personal teacher contacts are most desirable in all rehabilitation work, the author recognizes that this is not always possible and writes to help the numerous hard of hearing who want to help themselves.

THE WATER-SOLUBLE GUMS—C. L. Mantell—*Reinhold*, 279 p., illus., \$6. A coordination and clarification of information in gum technology to bridge the gap between art and science in this field.

WORKING WITH ALUMINUM—Douglas B. Hobbs—*Bruce*, 126 p., illus., \$2.50. For the instructor, student, and home craftsman, this manual contains 25 useful projects described in detail.

Science News Letter, August 9, 1947

ENGINEERING

Super-Locomotive Planned Has Two Turbine Engines

➤ **RAILROADS**, seeking near-airplane speeds and power for ever-increasing loads, are trying turbine-powered locomotives. Such an engine, delivering 9,000 horsepower to 16 drive wheels, is the subject of newly-issued U. S. patent 2,424,676, assigned by Frank L. Alben of Pittsburgh to the Westinghouse Electric Corporation.

All told, the monster has 24 wheels; the eight unpowered ones are mounted on two four-wheel guide trucks, at the forward end and under the middle of the locomotive. There are two turbines, with reducing gears to the drive shaft. Trans-

mission is entirely mechanical. Controls are either mechanical or hydraulic.

The design, the inventor points out, permits the distribution of weight over practically the entire length of the engine. Use of multiple small driving wheels makes possible development of high speeds with minimum wear on rails.

Science News Letter, August 9, 1947

PHYSICS

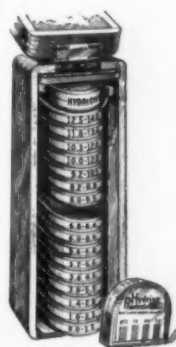
Compact Electron Microscope

➤ **A MORE COMPACT** type of electron microscope, which uses electrostatic fields instead of the more commonly used magnets for focussing its electron beam, is the invention offered by two General Electric Company physicists, Dr. Charles H. Bachman and Simon Ramo, for a series of four patents, 2,424,788 through 2,424,791. An outstanding advantage claimed for the new design is that the vacuum chamber is small, thereby reducing the time needed for evacuating between changes of specimens. Patent rights are assigned to the employing corporation.

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Hydriion pH Papers In One Compact Case



This new variety of sensitive pH papers offers a sharp color change within 0.25 pH unit of almost any point of interest from pH 0 to 14.

Hydriion test papers are so simple, so accurate, now so nearly universal, that this Set H-20 should be in the hands of every worker making pH measurements in laboratory or plant.

Price: Complete Set H-20, \$20

Write for Price List of the separate Test Papers

R. P. CARGILLE

114-C Liberty Street New York 6, N. Y.

• New Machines And Gadgets •

If you want more information on the new things described here, send a three-cent stamp to SCIENCE NEWS LETTER, 1719 N St., Washington 6, D. C. and ask for Gadget Bulletin 374. To receive this Gadget Bulletin without special request each week, remit \$1.50 for one year's subscription.

✿ **VELVET-LIKE** soft finish, applicable at home to surfaces of wood, plastic, metal, paper or cloth, consists of extremely short rayon fibers driven by a spray gun into a coating of a special adhesive. The force of the spray causes one end of each fiber to penetrate the glue, the rest of the fiber standing erect.

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✿ **TUBELESS TIRES** for automobiles, now undergoing all known tire tests, will be available soon. The new tire, with rayon cord construction, is said to combine the safety feature of puncture-sealing inner tubes with improved riding qualities.

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✿ **MINIATURE** toy racer resembles the full-sized automobile in beauty and design. It has a streamlined body of plastic construction, rubber-tired wheels, and a manually wound spring motor, which can run it over 150 feet at 15 miles per hour on one winding.

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✿ **DIAMOND-TIPPED** phonograph needles are now available at a relatively reasonable price due to new high-speed methods of grinding and polishing. Their advantage is principally their long life; test tips have been run daily for two years without showing wear.

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✿ **HEARING-AID**, worn but invisible in the ear of the girl in the picture, replaces the ordinary button with a delicately shaped flesh-colored plastic rim which fits snugly into the ear. A slender



transparent tube, behind the ear, carries sound from a tiny receiver hidden in the hair.

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✿ **AIR FILTER** for sleeping and other rooms, an improved electrically operated type, fits on a window-sill and draws the air from the outside. The cabinet-finished radio-size box and its filters remove dust, soot and plant pollen from the air. Extension panels fit it under ordinary sash.

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✿ **CASTER** for trucks used in factories, station platforms and airports have what is called floating hubs to permit smooth movement over roughness. The wheel

has springs between its rim and axle which keep it in contact with the ground at all times and ride it over bumps without lifting the load.

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✿ **HOME TOOL** for amateur plumbers taps out a new seat opening in most standard-type faucets, then adds a new brass replacement seat. It is an inexpensive steel device, easy to operate.

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✿ **ODOR CONTROL** of new manufactured products is obtained by use of an odor classification set. This consists of 32 vials, each of which contains a liquid with what might be called a standard distinctive odor. Substances being tested can be compared with the standards by any person with a good sense of smell.

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To Keep Up to Date in CHEMISTRY

Read the Science Service Magazine
CHEMISTRY. July issue contents:

Artificial Protein Fibers—Carbon 14 Constantly Created—Fission of Uranium—Professional Training in Chemistry—Science and the Art of Living—Mutants on Borderland of Life—For the Home Lab: Anaesthesia—Nitrogen Fixed by New Process—Hints for Your Lab: It Shines in the Dark—Chemical Ways to Do Things—Chemical Things To Do: Pictures by Flickering Light—Classics of Chemistry: Thallium and Indium—Ramie the Versatile—Editorial: Dinner by Capsule.

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Question Box

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CHEMISTRY

What happens to francium after its five-minute life is lived? p. 89.

ENGINEERING

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Pictures: Cover, Scripta Mathematica; Monsanto Chemical Co., p. 83; Chicago Natural History Museum, p. 85; B. F. Goodrich Co., p. 87; Farnsworth, p. 90; General Motors, p. 91.

Where published sources are used they are cited.

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RADIOBIOLOGY

What has been learned about plants from research with radioactive isotopes? p. 84.

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